

**COMMON COURSE OUTLINE: Course discipline/number/title: PHYSICS 2227: Modern Physics**

**A. CATALOG DESCRIPTION**

1. **Credits:** 3
2. **Hours/Week:** 3
3. **Prerequisites (Course discipline/number):** PHYS 1128, MATH 1128 and concurrent enrollment in MATH 2237 or permission of instructor.
4. **Co-requisites (Course discipline/number):** None
5. **MnTC Goals (if any):** NA

This course is a one-semester overview of modern physics. Topics studied include special relativity, the experimental basis of quantum mechanics, wave-particle duality, introduction to wave mechanics, the Schrodinger Equation, application of the Schrodinger equation to the hydrogen atom and the development of the atomic structure, molecular structure, solid state and nuclear structure. College level reading and writing skills are required.

**B. DATE LAST REVISED (Month, year):** April, 2008

**C. OUTLINE OF MAJOR CONTENT AREAS:**

Lecture:

1. Special theory of relativity
2. Quantum theory of light
3. Wave/particle duality
4. de Broglie waves
5. Heisenberg uncertainty principle
6. Wave mechanics
7. Schrodinger equation in one dimension
8. Schrodinger equation in three dimensions
9. The hydrogen atom
10. Atomic physics and atomic structure
11. Statistical physics
12. Physics of solids

Integral calculus is used extensively, and the Schrodinger equation is solved for many situations.

**D. LEARNING OUTCOMES (GENERAL):** The student will be able to:  
Learn some of the principles of modern physics and be able to use these principles to understand and model many phenomena of the physical world.

**E. LEARNING OUTCOMES (MNTC):** NA

**F. METHODS FOR EVALUATION OF STUDENT LEARNING:**

Evaluation methods may include any or all of the following:

1. Objective exams
2. Essay exams
3. Research papers
4. Quizzes
5. Written homework
6. Small group projects
7. Oral presentations
8. Or any other as deemed appropriate by the instructor and so indicated by his/her syllabus (original or revised).

**G. SPECIAL INFORMATION (if any):**

A scientific calculator is required.